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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/009,799	10/30/2002	Ralph Etienne-Cummings	03940012AA	1099

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EXAMINER	
MARC, MCDIEUNEL	

ART UNIT	PAPER NUMBER
3661	

DATE MAILED: 05/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/009,799	ETIENNE-CUMMINGS ET AL.	
	Examiner	Art Unit	
	McDieunel Marc	3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1/30/2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-67* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *52-54 and 65-67* is/are allowed.

6)☒ Claim(s) *1,4-8,11-14,16-23,25-27,30-34,37-40,42-48,50,51 and 55-64* is/are rejected.

7)☒ Claim(s) *2,3,10,15,24,28,29,36,41 and 49* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 October 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-67 are pending in the application.

2. The rejection to claims **1, 4-8, 11-14, 16-23, 25-27, 30-34, 37-40, 42-48, 50, 51 and 55-64** are rejected under 35 U.S.C. 102(a) as being anticipated by **Billard et al. (*Biologically Inspired neural controllers for motor control in a quadruped robot*, 2000)** is **maintained**.

The objection to claims 2, 3, 10, 15, 24, 28, 29, 36, 41 and 49 is also **maintained**.

The allowability to Claims 52-54 and 65-67 is **maintained**.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims **1, 4-8, 11-14, 16-23, 25-27, 30-34, 37-40, 42-48, 50, 51 and 55-64** are rejected under 35 U.S.C. 102(a) as being anticipated by **Billard et al. (*Biologically Inspired neural controllers for motor control in a quadruped robot*, 2000)**.

As per claims 1, 4-8, 11-14, 16-23, 25-27, 30-34, 37-40, 42-48, 50, 51 and 55-64,

Billard et al. teaches This paper presents **biologically inspired neural controllers** for generating motor patterns in a quadruped robot. Sets of artificial neural networks are presented which provide 1) pattern generation and gait control, allowing continuous passage from walking to trotting to galloping, 2) control of sitting and lying down behaviors, and 3) control of scratching. The neural controllers consist of sets of oscillators composed of leaky-integrator neurons, which control pairs of flexor-extensor muscles attached to each joint. The networks receive sensory feedback proportional to the contraction of simulated muscles and to joint flexion. Similarly to what is observed in cats, locomotion can be initiated by either applying tonic (i.e. non-oscillating) input to the locomotion network or by sensory feedback from extending the legs. The networks are implemented in a quadruped robot. It is shown that computation can be carried out in real time and that the networks can generate the above mentioned motor behaviors (see abstract) which equates the inventive concept. With respect to (central pattern generator (CPG)) (see page 1, section 1 and page 2), which covers the entire invention (see entire document).

Allowable Subject Matter

5. Claims 52-54 and 65-67 are allowed.

6. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fail to teach or fairly suggest with respect to claim 52, a method for controlling a mechanical or biological system for rhythmic movement, comprising: (A) measuring sensory feedback to obtain measured sensory feedback; (B) processing the measured sensory feedback to obtain data for a plurality of designated parameters; and (C) via a central pattern generator-based system, applying a set of rules to the obtained data to generate at least one signal for commanding the limb or biological system for rhythmic movement, wherein the central pattern generator-based system comprises a circuit that mimics a biological central pattern generator. With respect to claim 65, a method for modifying a continuous waveform provided by a non-biological central pattern generator, comprising the steps of: (A) provision of a continuous waveform by a non-biological central pattern generator; (B) provision of sensory feedback to the non-biological central pattern generator; (C) rule-application by the non-biological central pattern generator to the sensory feedback; (D) based on the rule-application, determination by the non-biological central pattern generator to modify or maintain the continuous wave form.

7. Claims 2, 3, 10, 15, 24, 28, 29, 36, 41 and 49 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

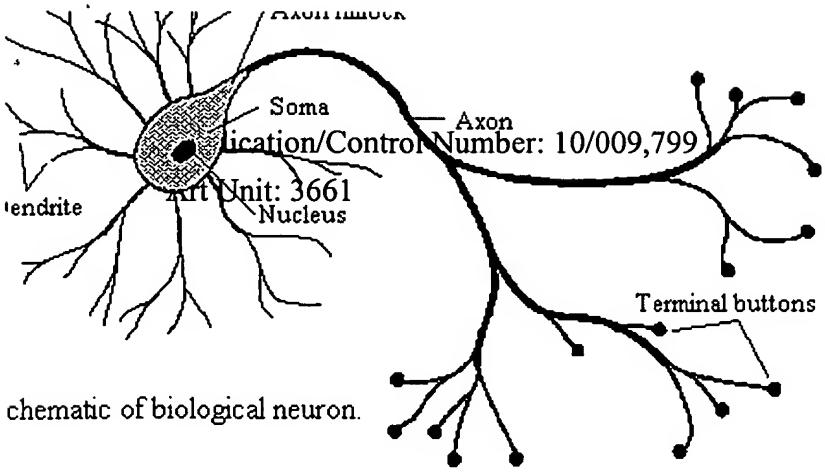
The prior art of record fail to teach or fairly suggest with respect to claims 2 and 28, a system, including a system for phase adjustment of the central pattern generator based on a sensory trigger in or derived from sensory feedback. With respect to claims 3 and 29, a system for phase adjustment of the central pattern generator based on at least one sensory trigger in or derived from sensory-feedback; and a system for controlling firing frequency of motoneurons as a function of the sensory feedback or the sensory trigger. With respect to claims 9 and 35, a system including at least one chip that includes dynamic memories and phase modulators. With respect to claims 10 and 36, a system, wherein the system is a non-linear oscillator including electronic analogues of biological neurons, synapses and time-constraints, dynamic memories and phase modulators. With respect to claim 15 and 41, a system, wherein phasic coupling is in-phase, 180 degrees out of phase, or any number of degrees out of phase. With respect to claim 24 and 49, a system, including a system for phase adjustment of
the central pattern generator based on at least one sensory trigger in the received
sensory feedback.

Response to Arguments

9. As to the reference not teaching a sensory feedback (Billard et al. abstract for sensory feedback).

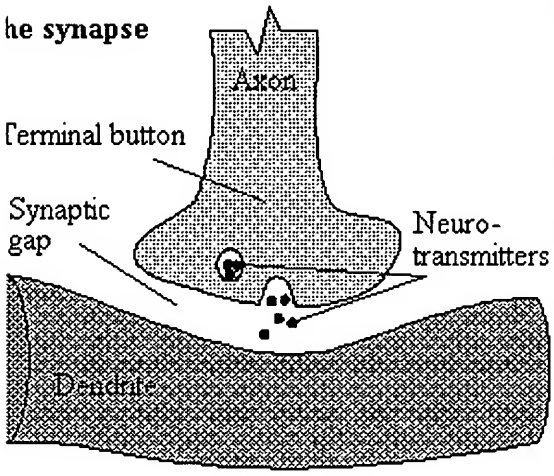
With respect to "biological neuron" such limitation does not have any patentable weight (see the note below, regarding "biological neuron").

The Biological Neuron. The brain is a collection of about 10 billion interconnected neurons. Each neuron is a cell [right] that uses biochemical reactions to receive, process and



chematic of biological neuron.

transmit information. A neuron's dendritic tree is connected to a thousand neighbouring neurons. When one of those neurons fire, a positive or negative charge is received by one of the dendrites. The strengths of all the received charges are added together through the processes of spatial and temporal summation. Spatial summation occurs when several weak signals are converted into a single large one, while temporal summation converts a rapid series of weak pulses from one source into one large signal. The aggregate input is then passed to the soma (cell body). The soma and the enclosed nucleus don't play a significant role in the processing of incoming and outgoing data. Their primary function is to perform the continuous maintenance required to keep the neuron functional. The part of the soma that does concern itself with the signal is the axon hillock. If the aggregate input is greater than the axon hillock's threshold value, then the neuron *fires*, and an output signal is transmitted down the axon. The strength of the output is constant, regardless of whether the input was just above the threshold, or a hundred times as great. The output strength is unaffected by the many divisions in the axon; it reaches each terminal button with the same intensity it had at the axon hillock. This uniformity is critical in an analogue device such as a brain where small errors can snowball, and where error correction is more difficult than in a digital system. Each terminal button is connected to other neurons across a small gap called a synapse [left]. The physical and neurochemical characteristics of each synapse determines the strength and polarity of the new input signal. This is where the brain is the most



flexible, and the most vulnerable. Changing the constitution of various neuro- transmitter chemicals can increase or decrease the amount of stimulation that the firing axon imparts on the neighbouring dendrite. Altering the neurotransmitters can also change whether the stimulation is excitatory or inhibitory. Many drugs such as alcohol and LSD have dramatic effects on the production or destruction of these critical chemicals. The infamous nerve gas sarin can kill because it neutralizes a chemical (acetylcholinesterase) that is normally responsible for the destruction of a neurotransmitter (acetylcholine). This means that once a neuron fires, it keeps on triggering all the neurons in the vicinity. One no longer has control over muscles, and suffocation ensues.

Previous: Overview.
Next: A model of a neuron.
Last modified: September 21, 1998

10. Applicant's arguments filed 1/30/2 006 have been fully considered but they are not persuasive.

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to McDieunel Marc whose telephone number is (571) 272-6964. The examiner can normally be reached on 6:30-5:00 Mon-Thu.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Black can be reached on (571) 272-6956. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

McDieunel Marc

Saturday, April 22, 2006

MM/

THOMAS G. BLACK
SUPERVISORY PATENT EXAMINER
GROUP 3600